

*Preliminary Mapping
of the Mud Creek Landslide
with 4D Photogrammetry*

Jonathan Warrick, Andy Ritchie

May 30, 2017



*Mud Creek,
Big Sur,
California*



PROVISIONAL DATA SUBJECT TO REVISION

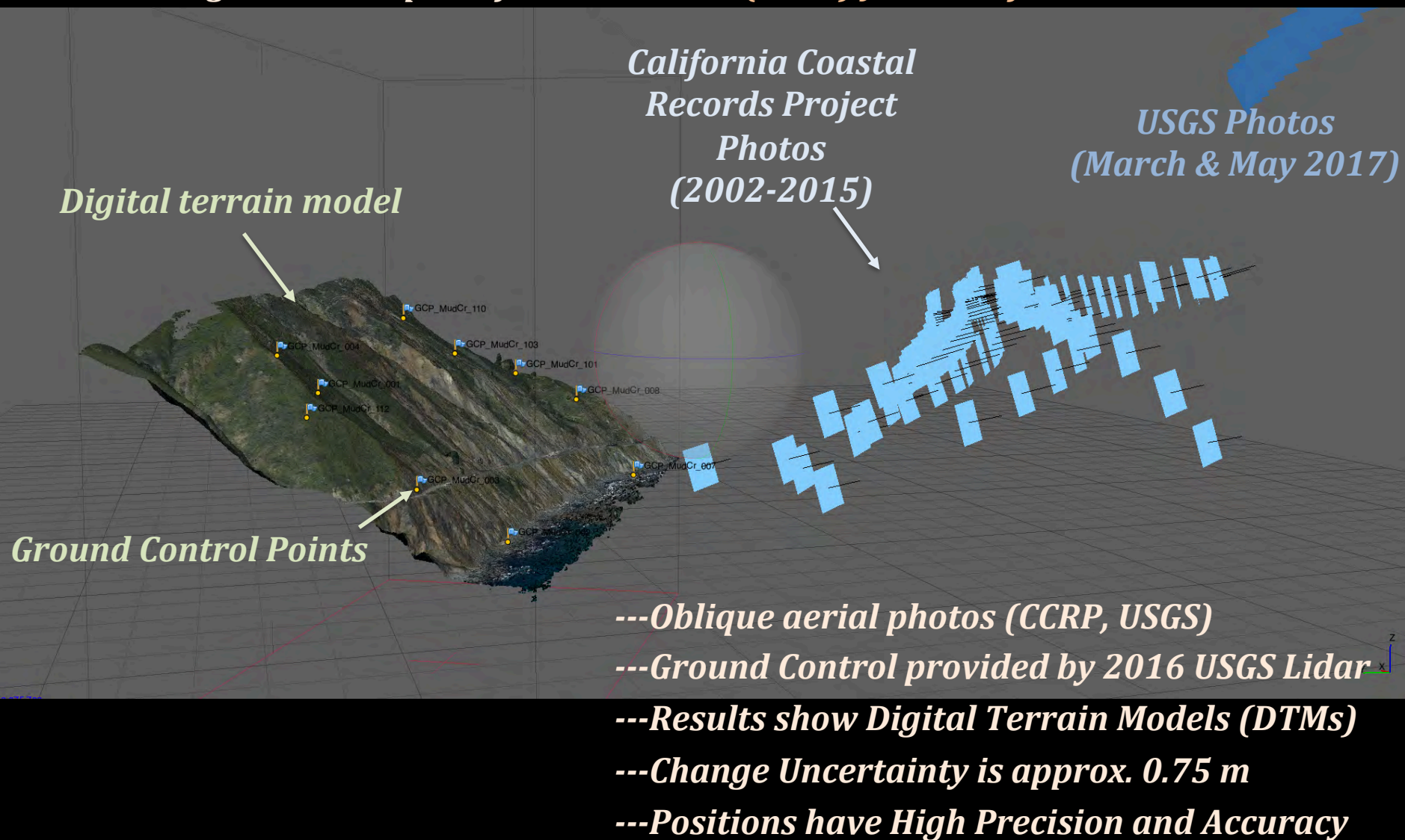
On May 20, 2017 ...



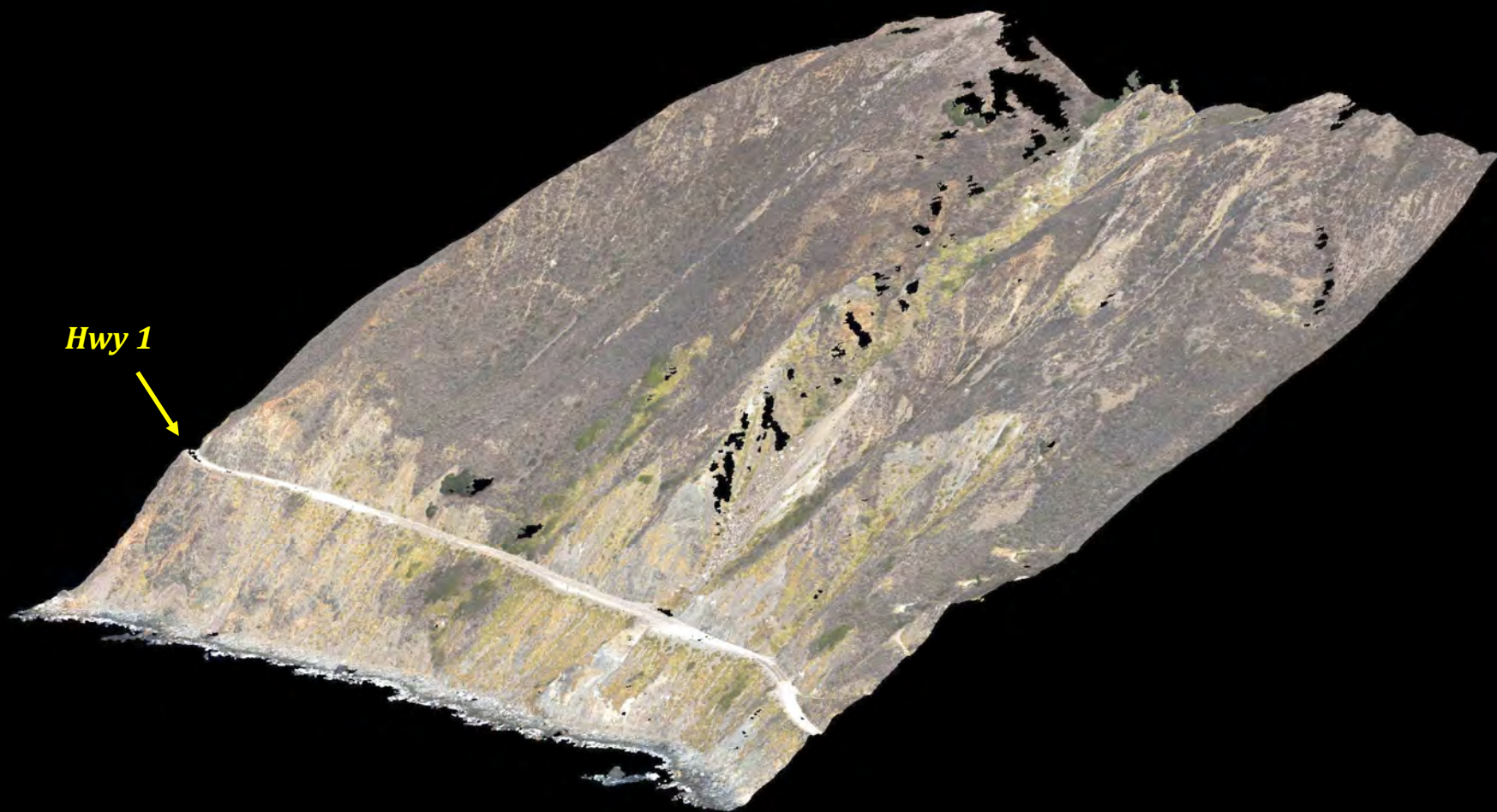
*Photo Credit: U.S. Geological Survey
May 27, 2017*

Measuring Topographic Change with 4D Photogrammetry

Utilizing the techniques of Warrick et al. (2017) Journal of Coastal Research



Mud Creek – Topographic Point Cloud – Oblique Perspective



*Photo Source:
California Coastal Records
Project*

September 11, 2015

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Oblique Perspective



Photo Source:
U.S. Geological Survey

March 8, 2017

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Oblique Perspective



*Photo Source:
U.S. Geological Survey*

May 19, 2017

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Oblique Perspective

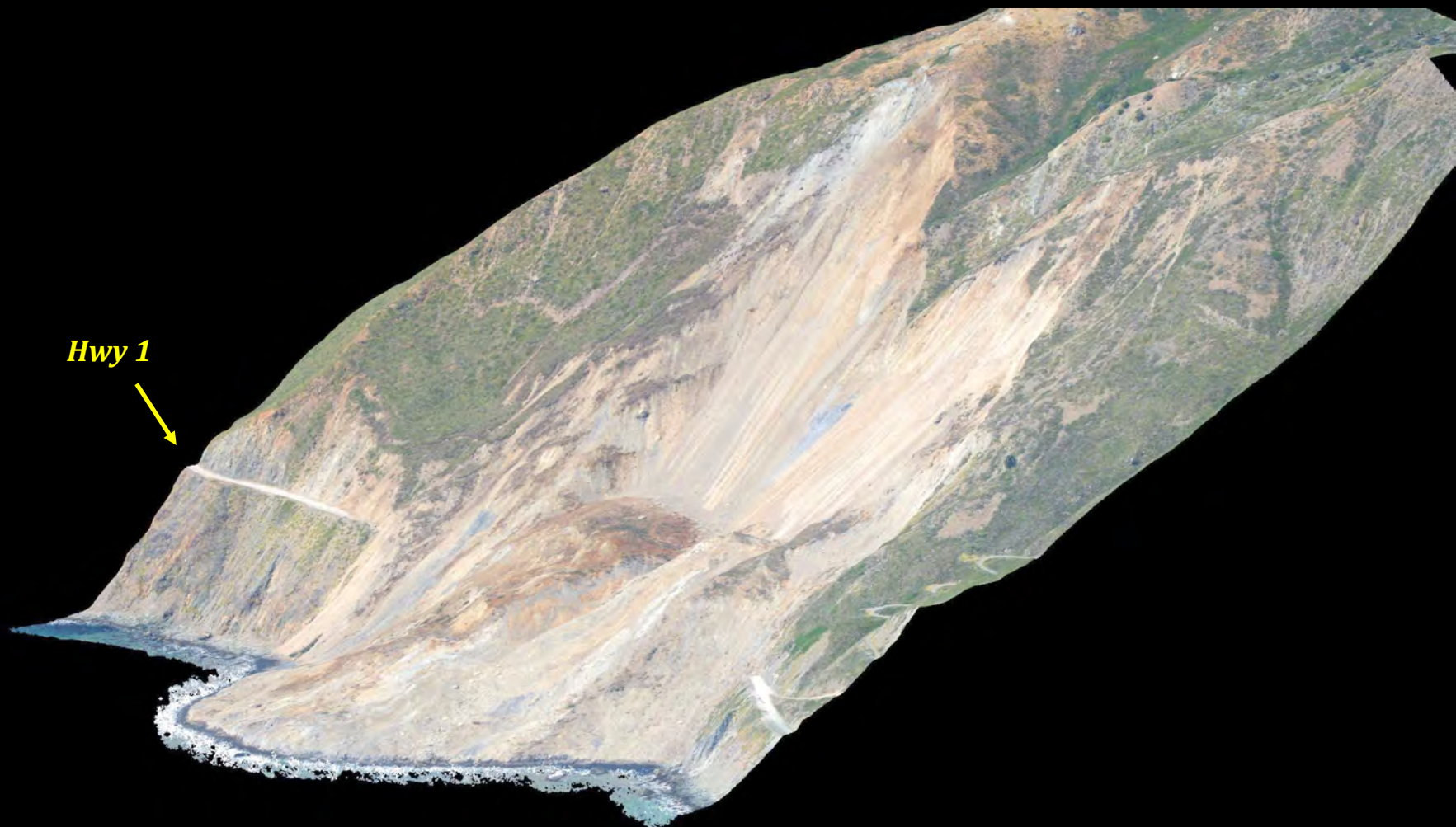
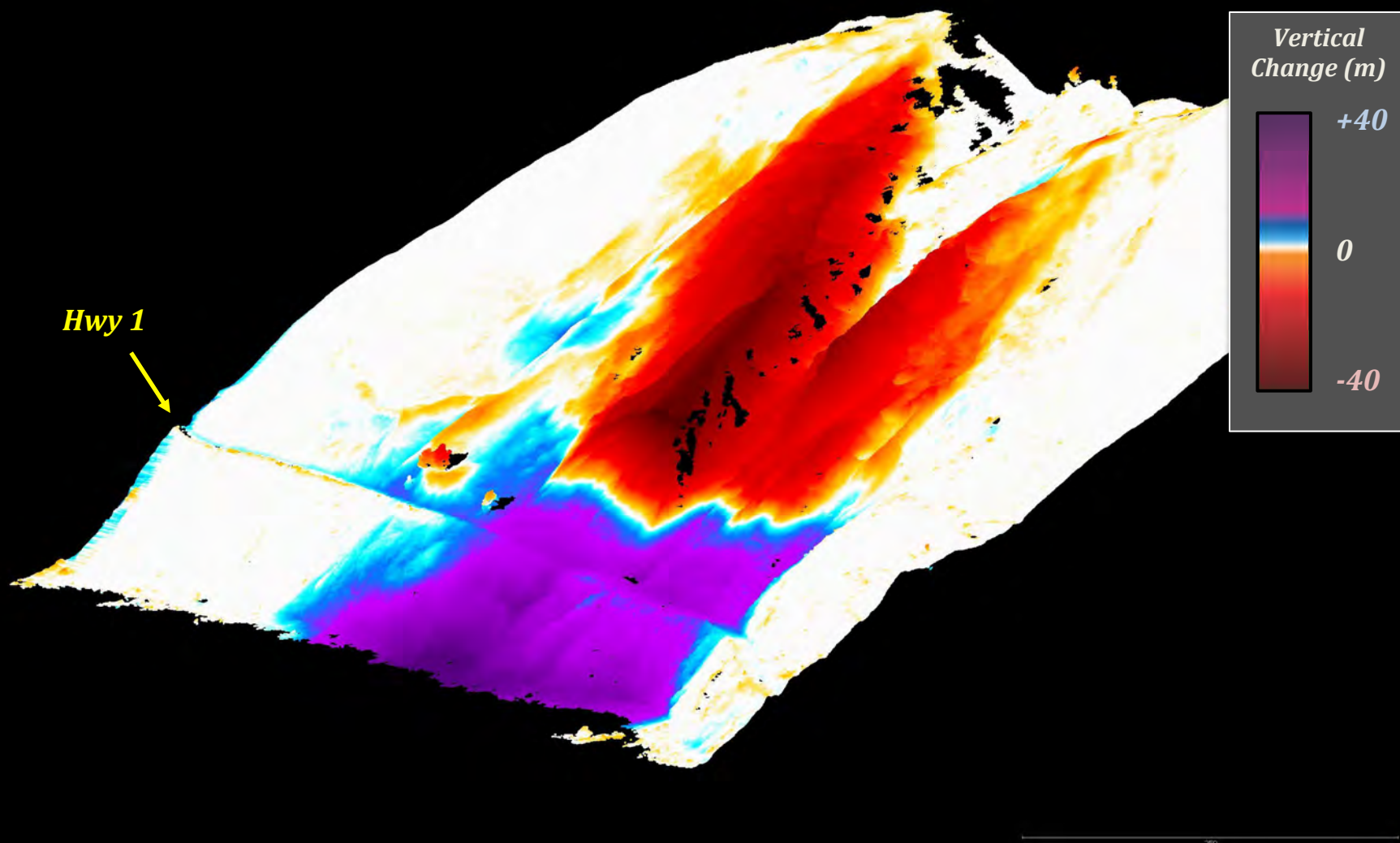


Photo Source:
U.S. Geological Survey

May 27, 2017

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Oblique Perspective



2015-'17 Topographic Change

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Oblique Perspective

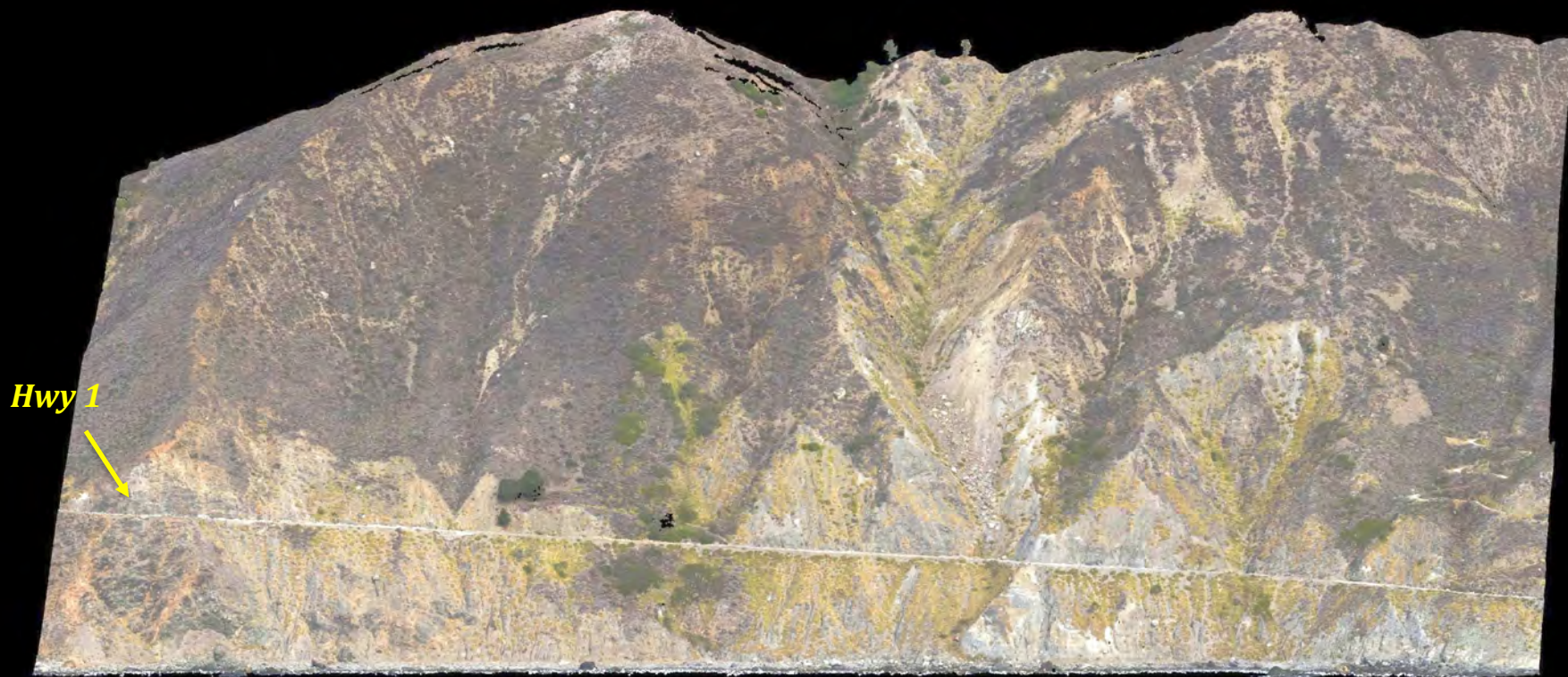


Photo Source:
California Coastal Records
Project

September 11, 2015

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Oblique Perspective

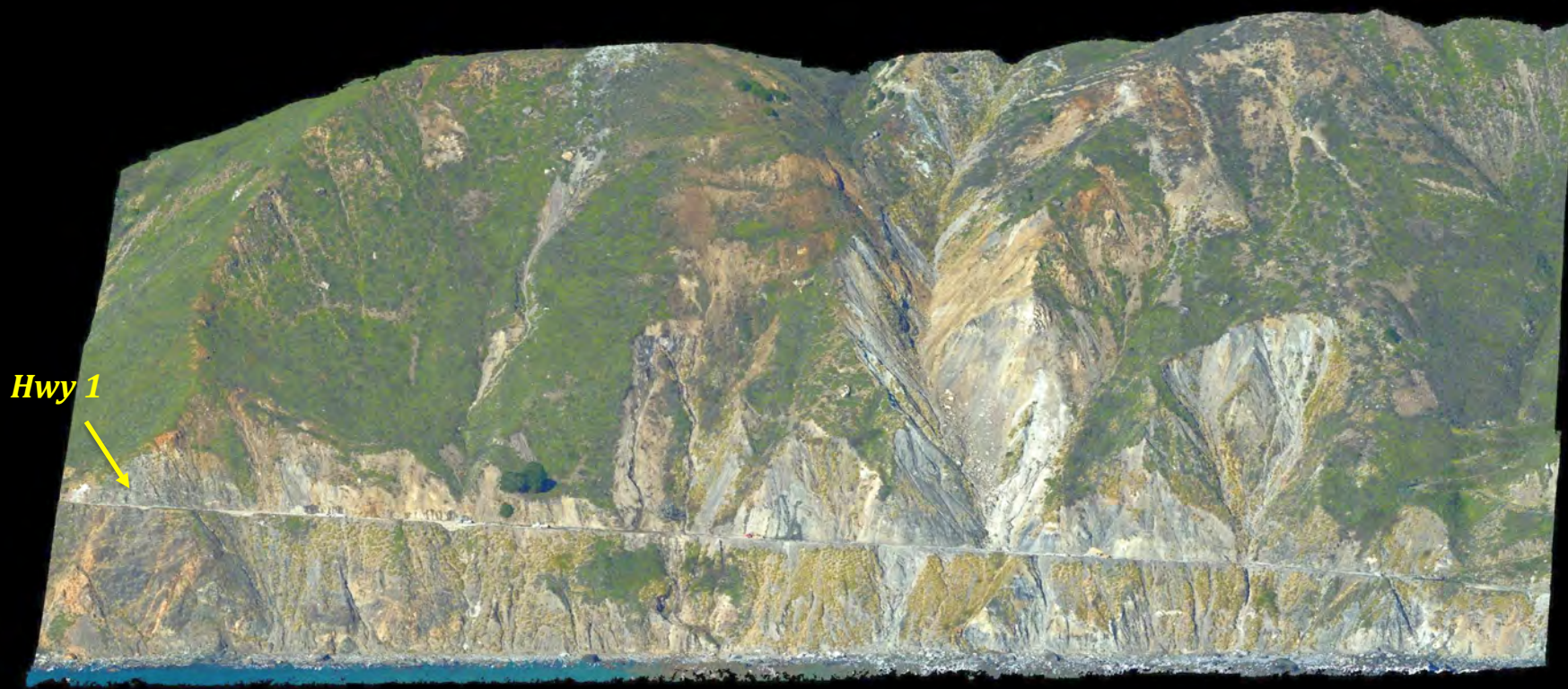
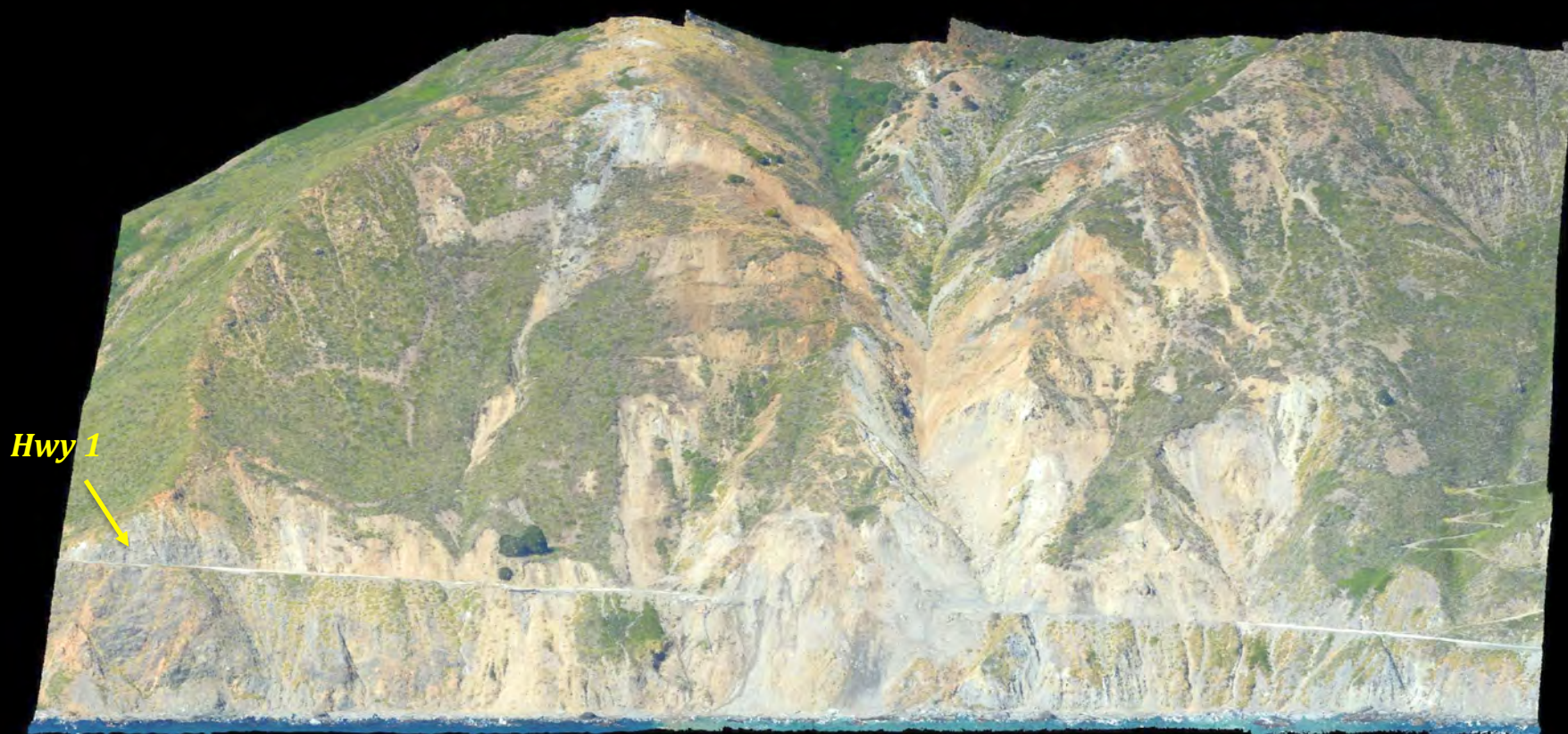


Photo Source:
U.S. Geological Survey

March 8, 2017

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Oblique Perspective



Hwy 1

New default point size: 3

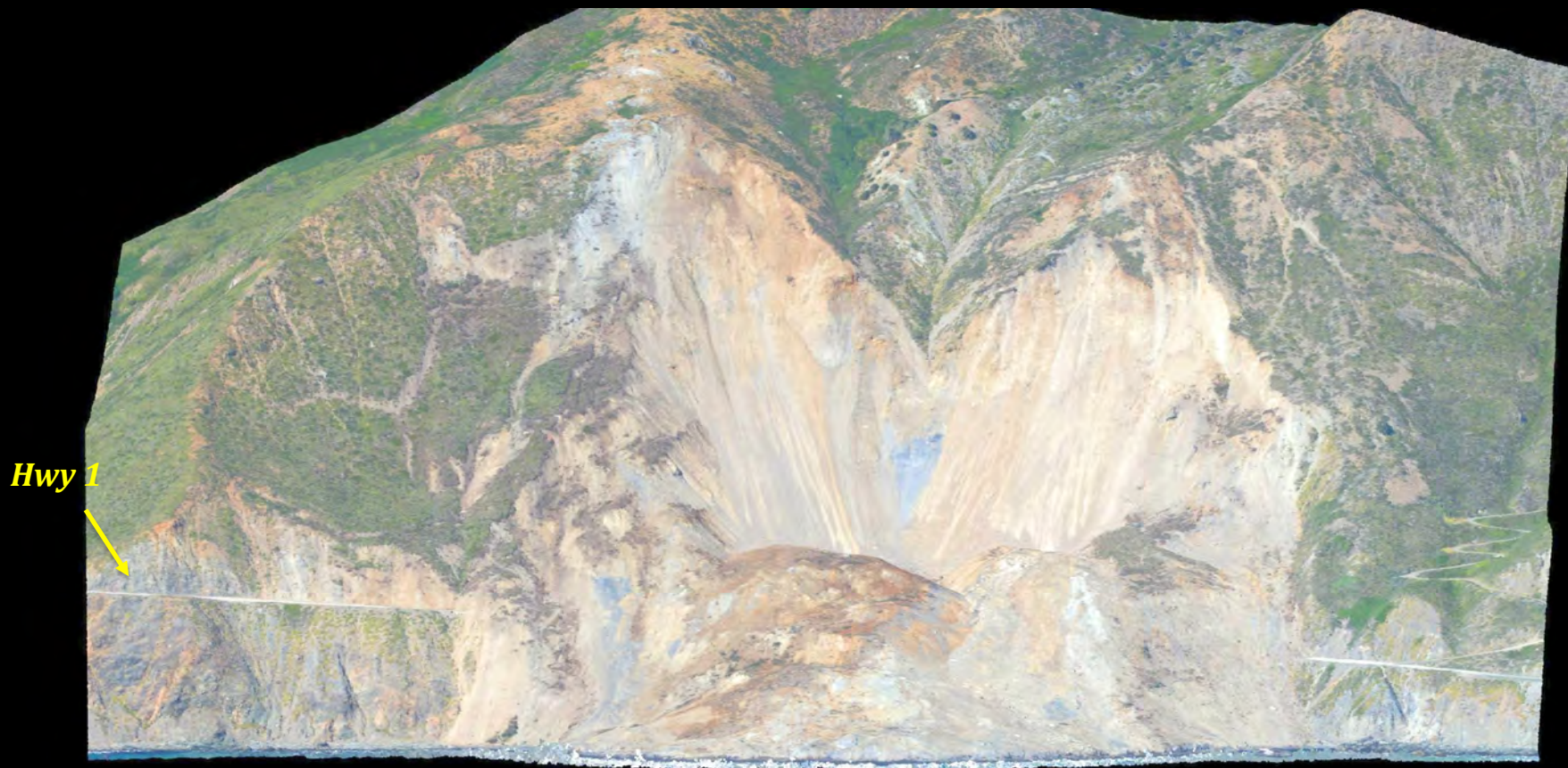
200

*Photo Source:
U.S. Geological Survey*

May 19, 2017

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Oblique Perspective



New default point size: 4

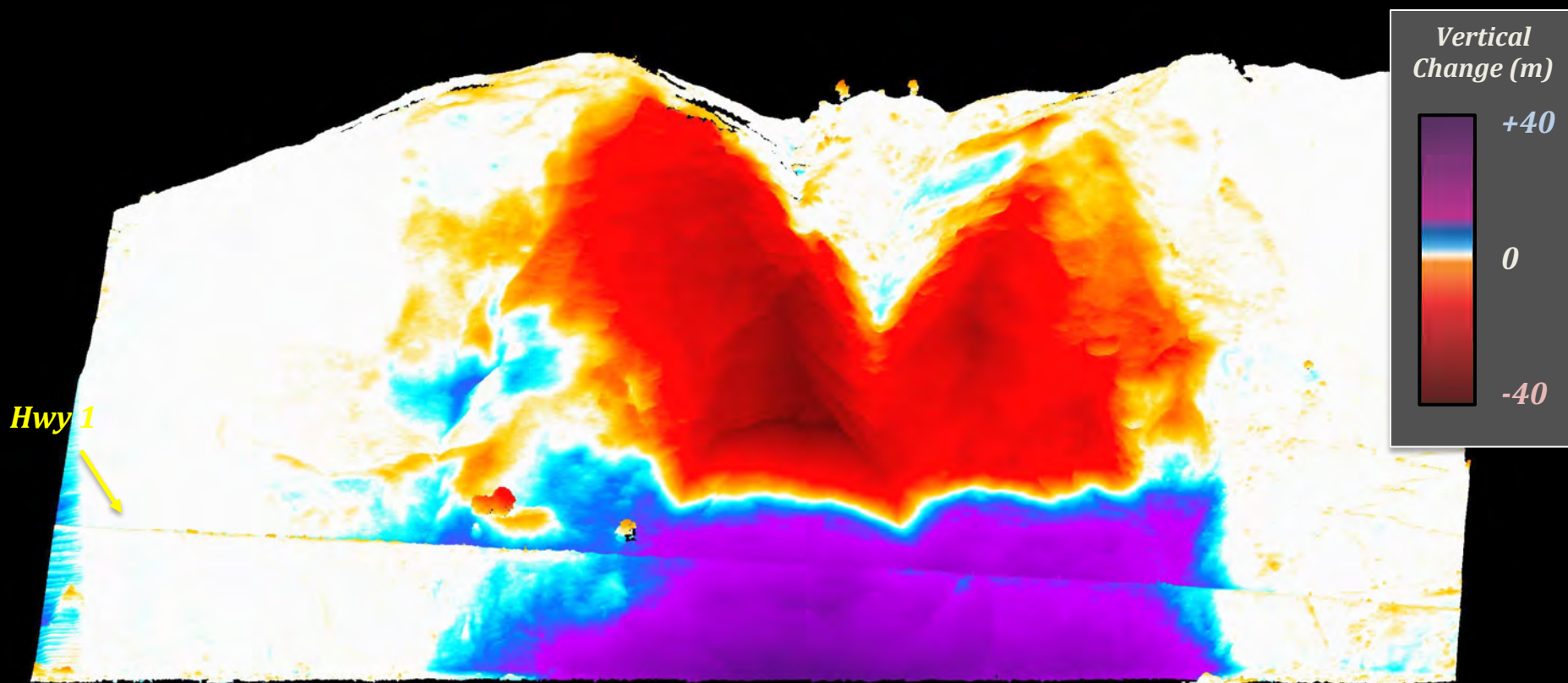
200

Photo Source:
U.S. Geological Survey

May 27, 2017

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Oblique Perspective



2015-'17 Topographic Change

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Oblique Perspective

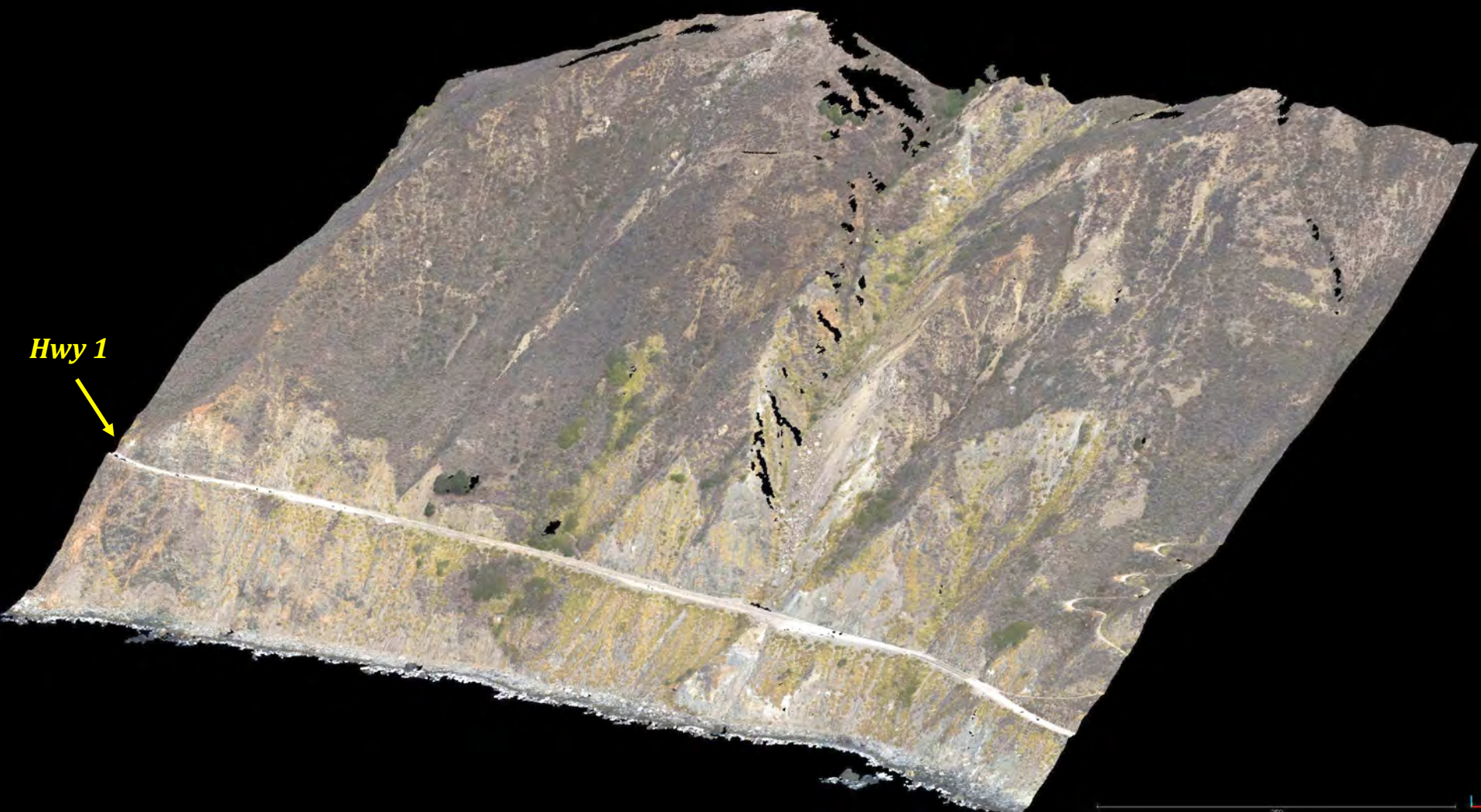
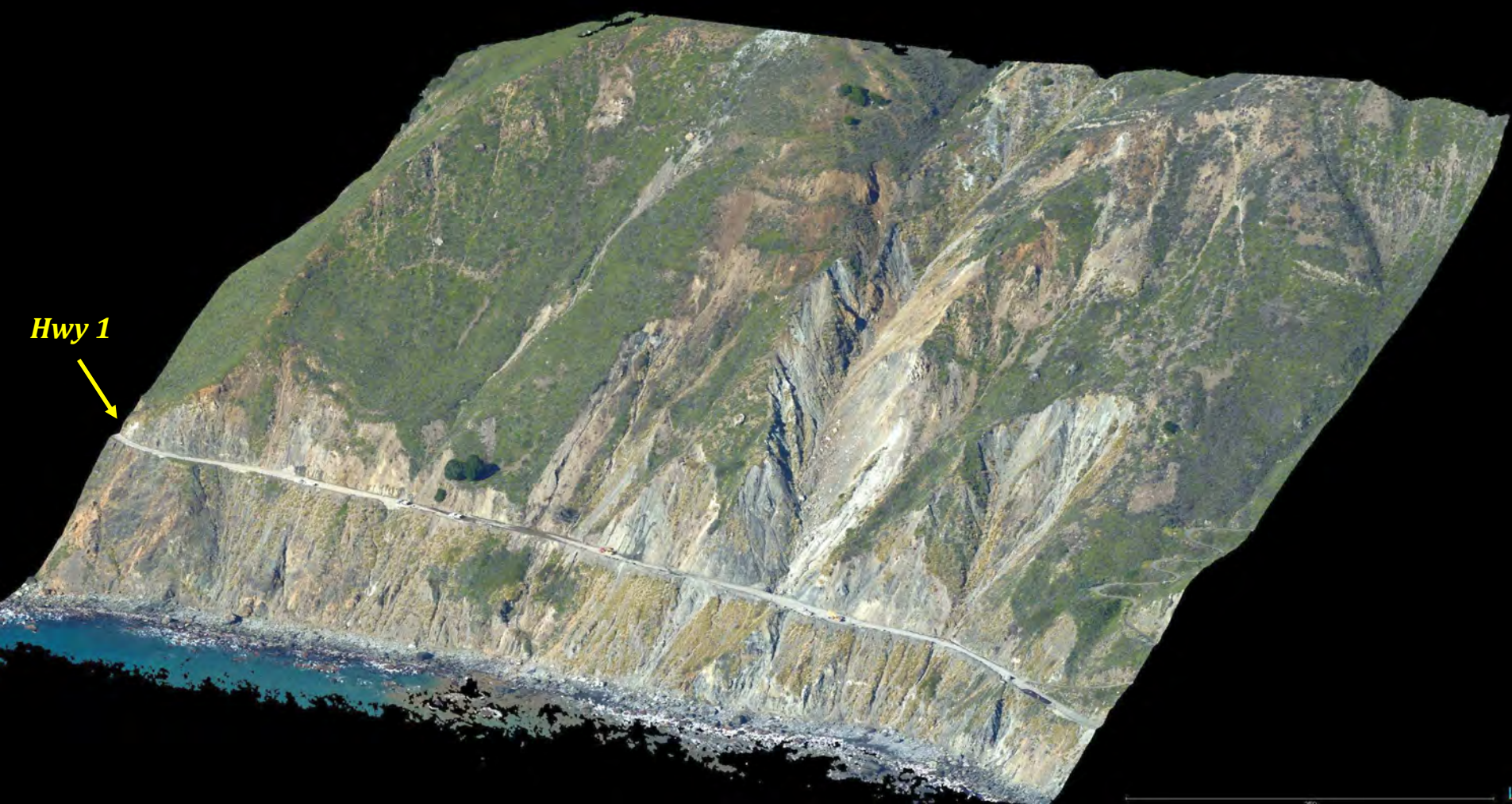


Photo Source:
California Coastal Records
Project

September 11, 2015

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Oblique Perspective



*Photo Source:
U.S. Geological Survey*

March 8, 2017

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Oblique Perspective

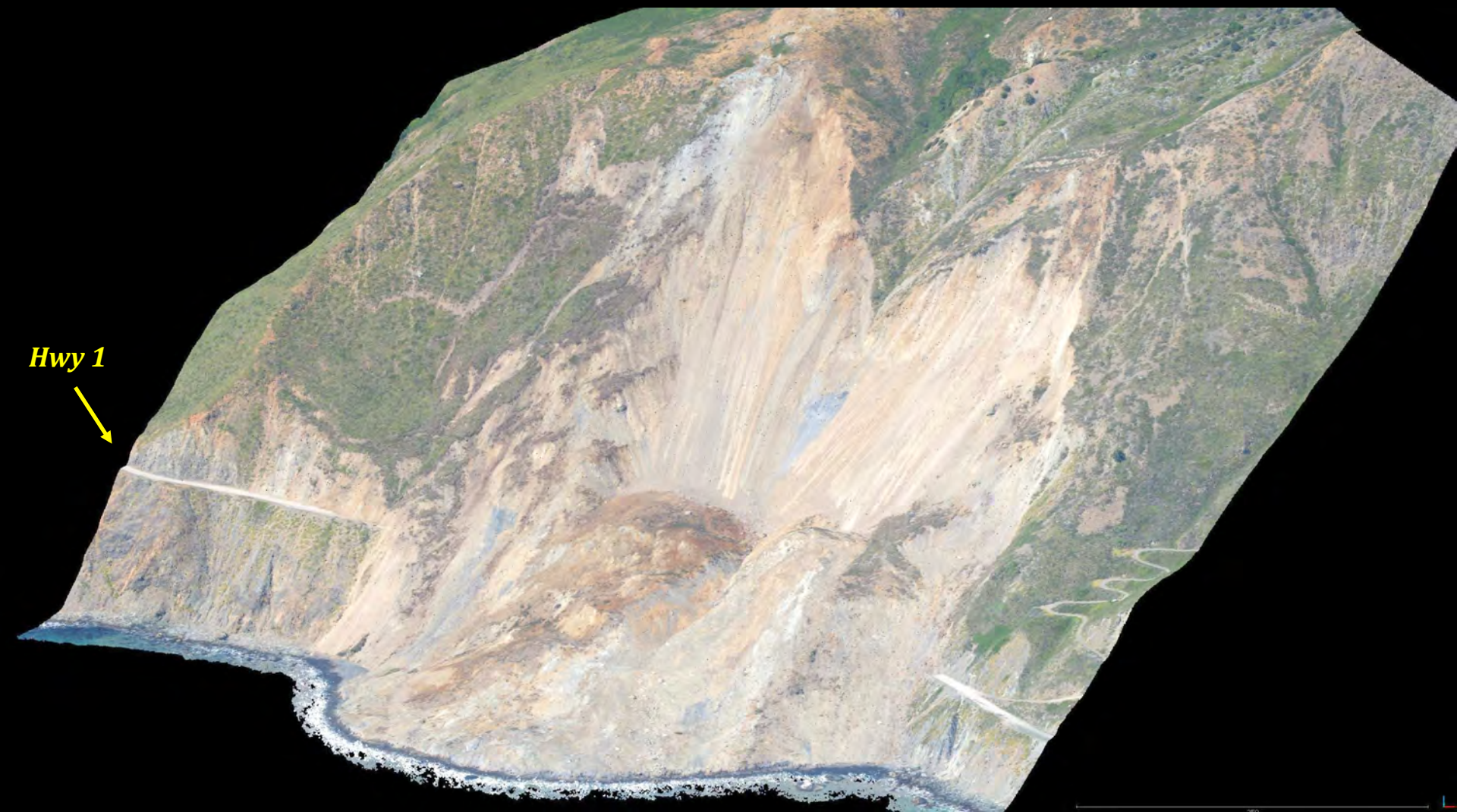


*Photo Source:
U.S. Geological Survey*

May 19, 2017

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Oblique Perspective

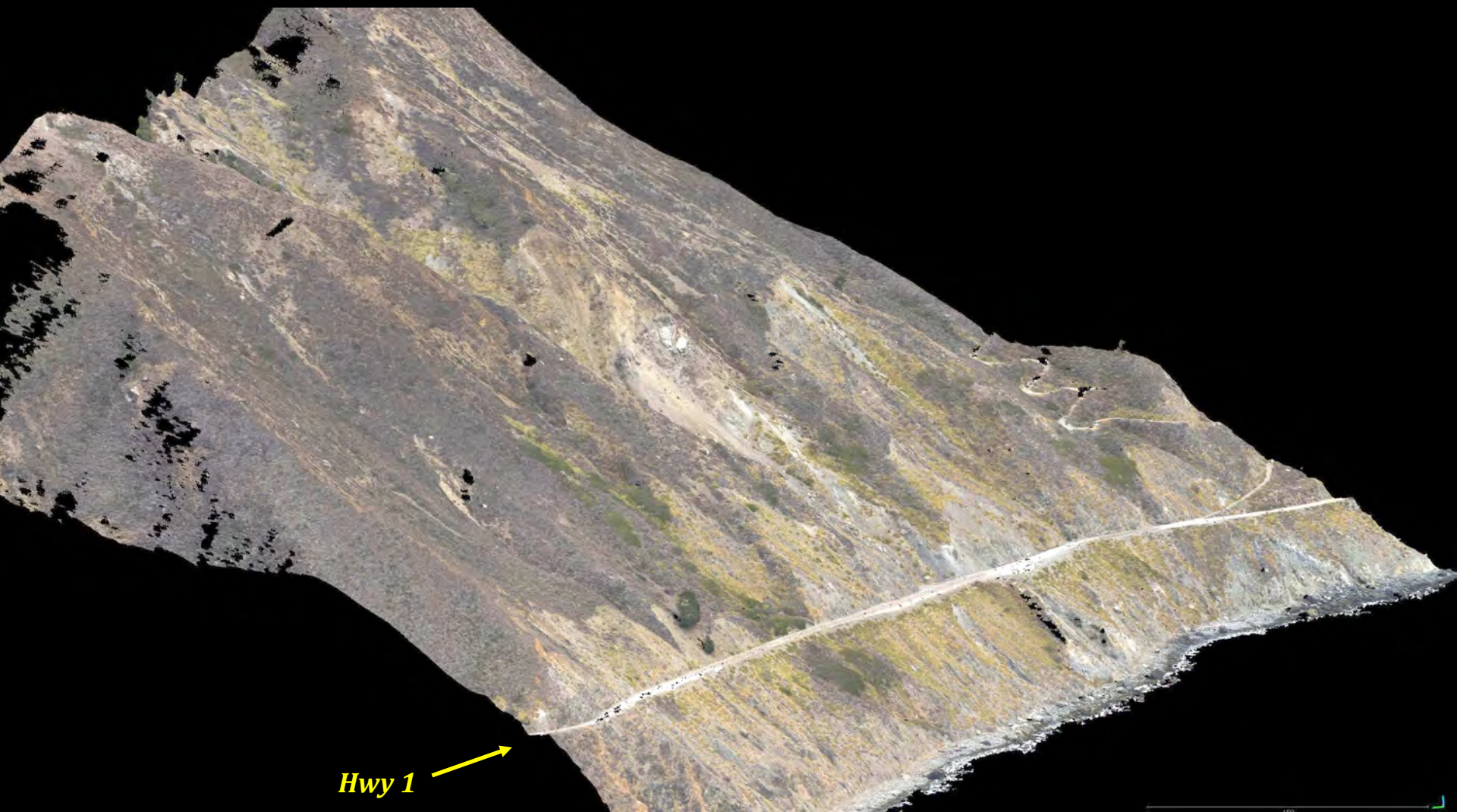


*Photo Source:
U.S. Geological Survey*

May 27, 2017

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Oblique Perspective



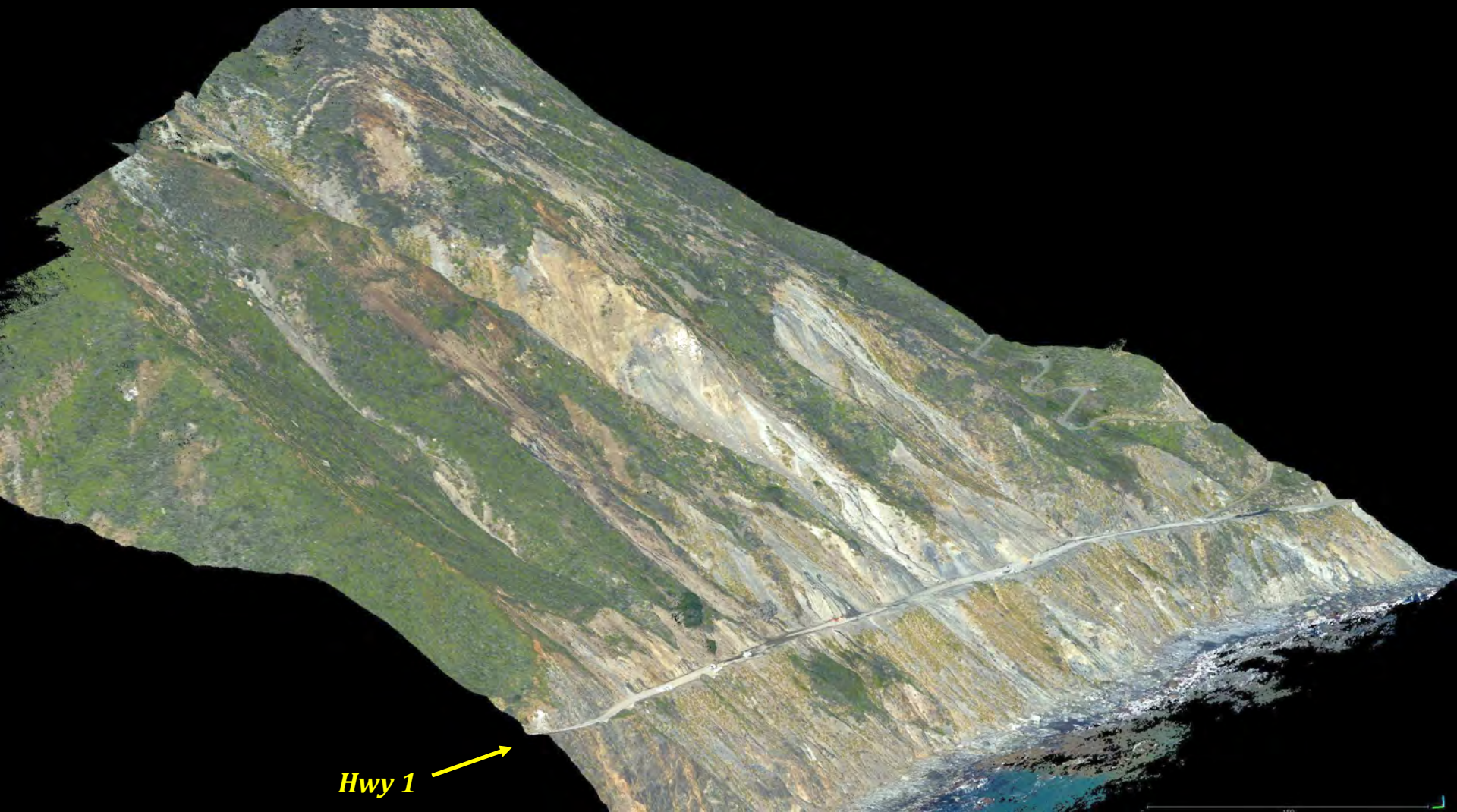
Hwy 1

*Photo Source:
California Coastal Records
Project*

September 11, 2015

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Oblique Perspective



Hwy 1

Photo Source:
U.S. Geological Survey

March 8, 2017

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Oblique Perspective

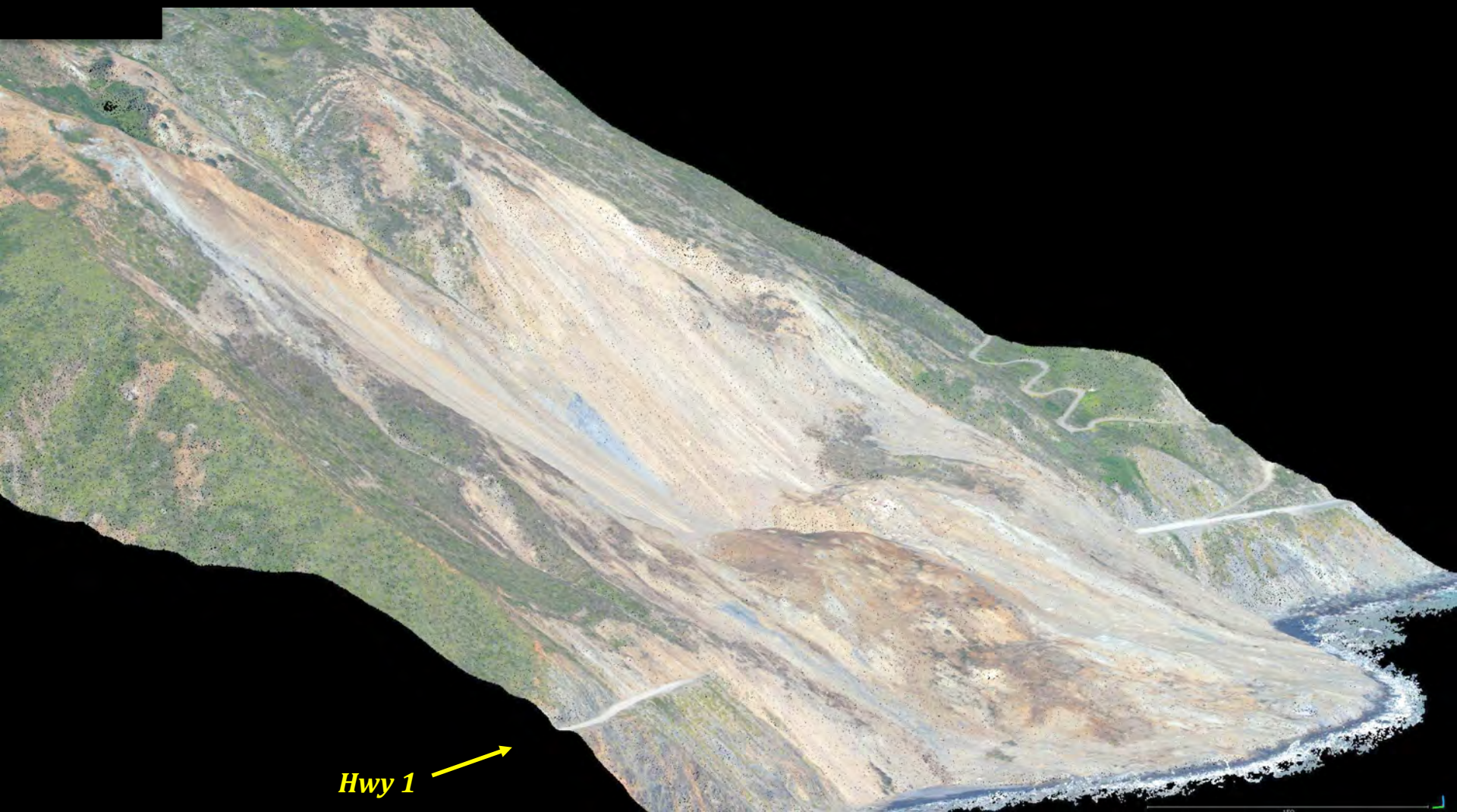


Photo Source:
U.S. Geological Survey

May 19, 2017

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Oblique Perspective



Hwy 1

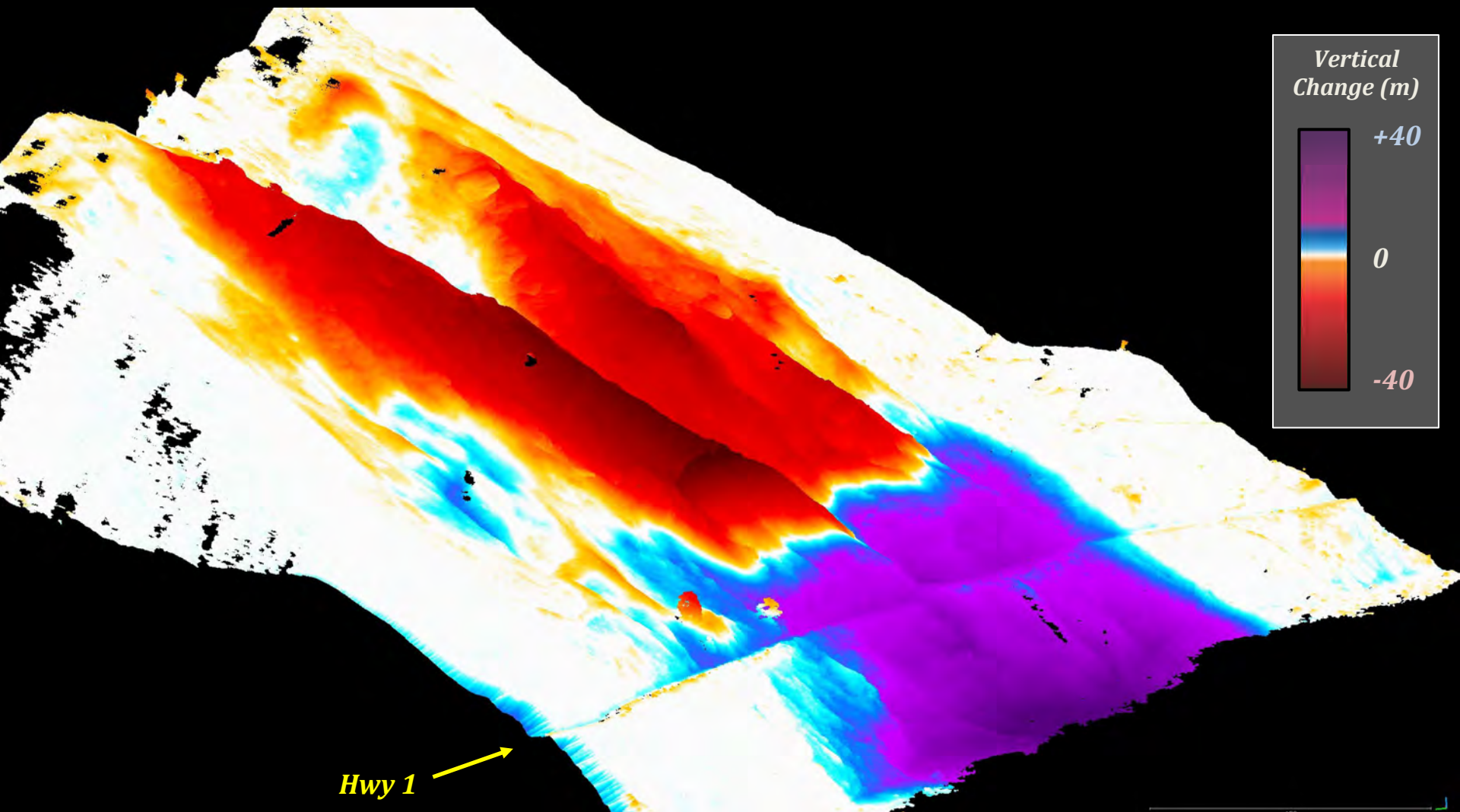


*Photo Source:
U.S. Geological Survey*

May 27, 2017

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Oblique Perspective



2015-'17 Topographic Change

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Vertical Perspective

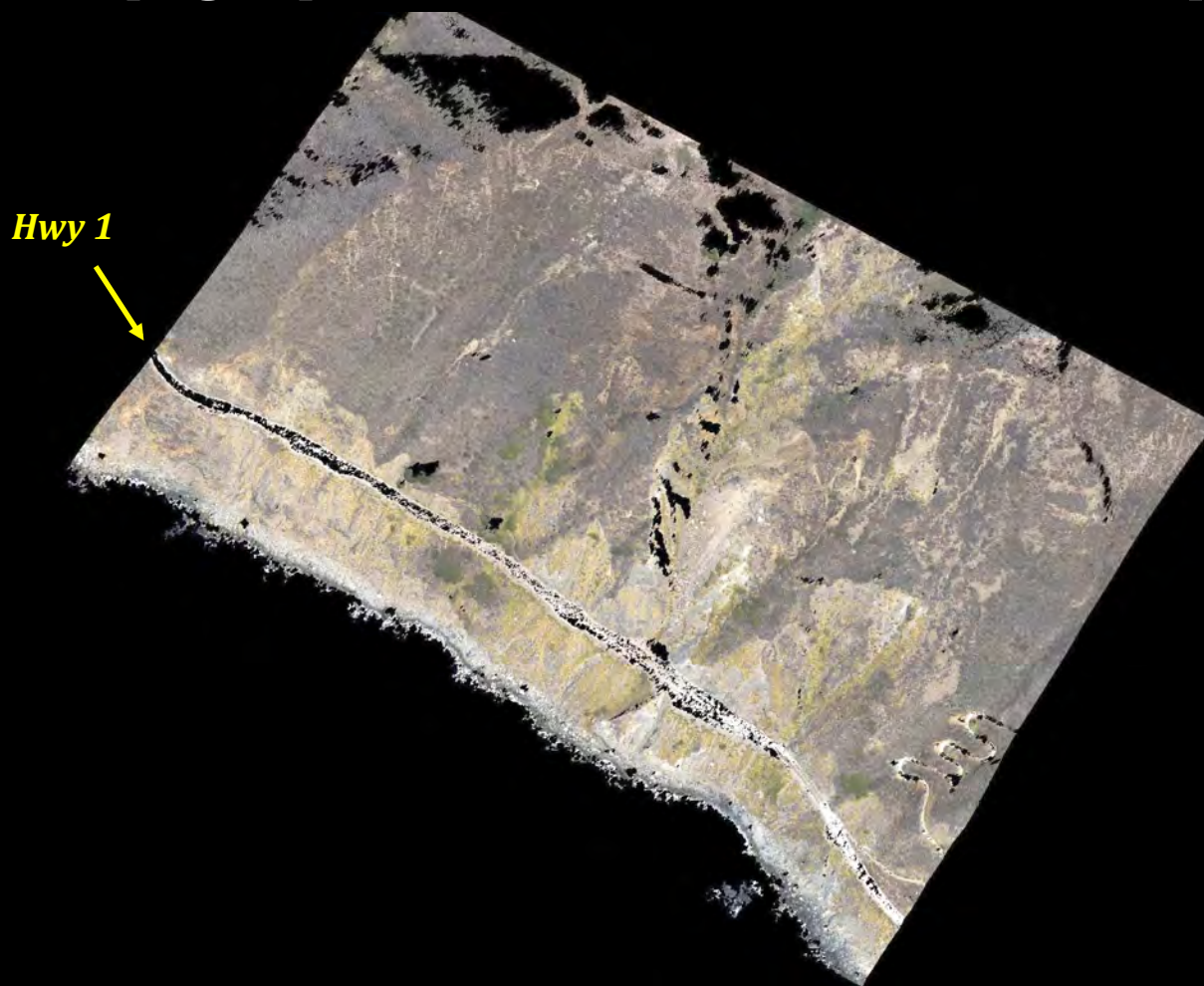


Photo Source:
California Coastal Records
Project

September 11, 2015

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Vertical Perspective

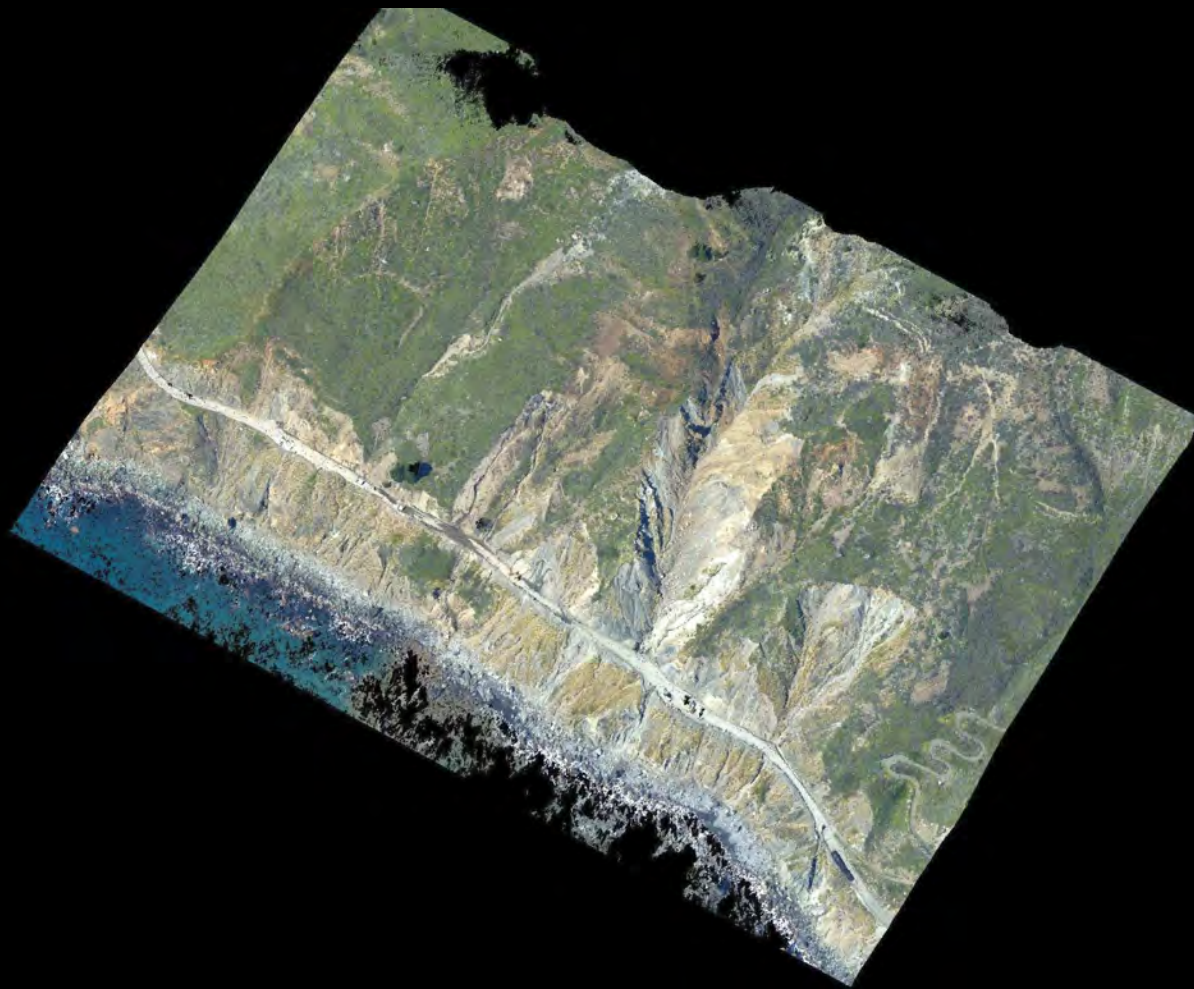


Photo Source:
U.S. Geological Survey

March 8, 2017

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Vertical Perspective



How default point size: 2

400

Photo Source:
U.S. Geological Survey

May 19, 2017

PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Vertical Perspective



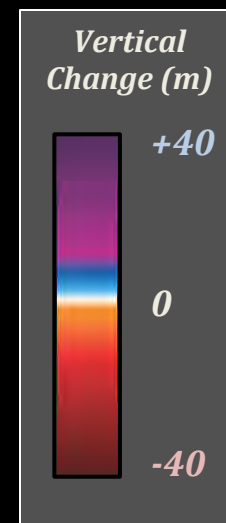
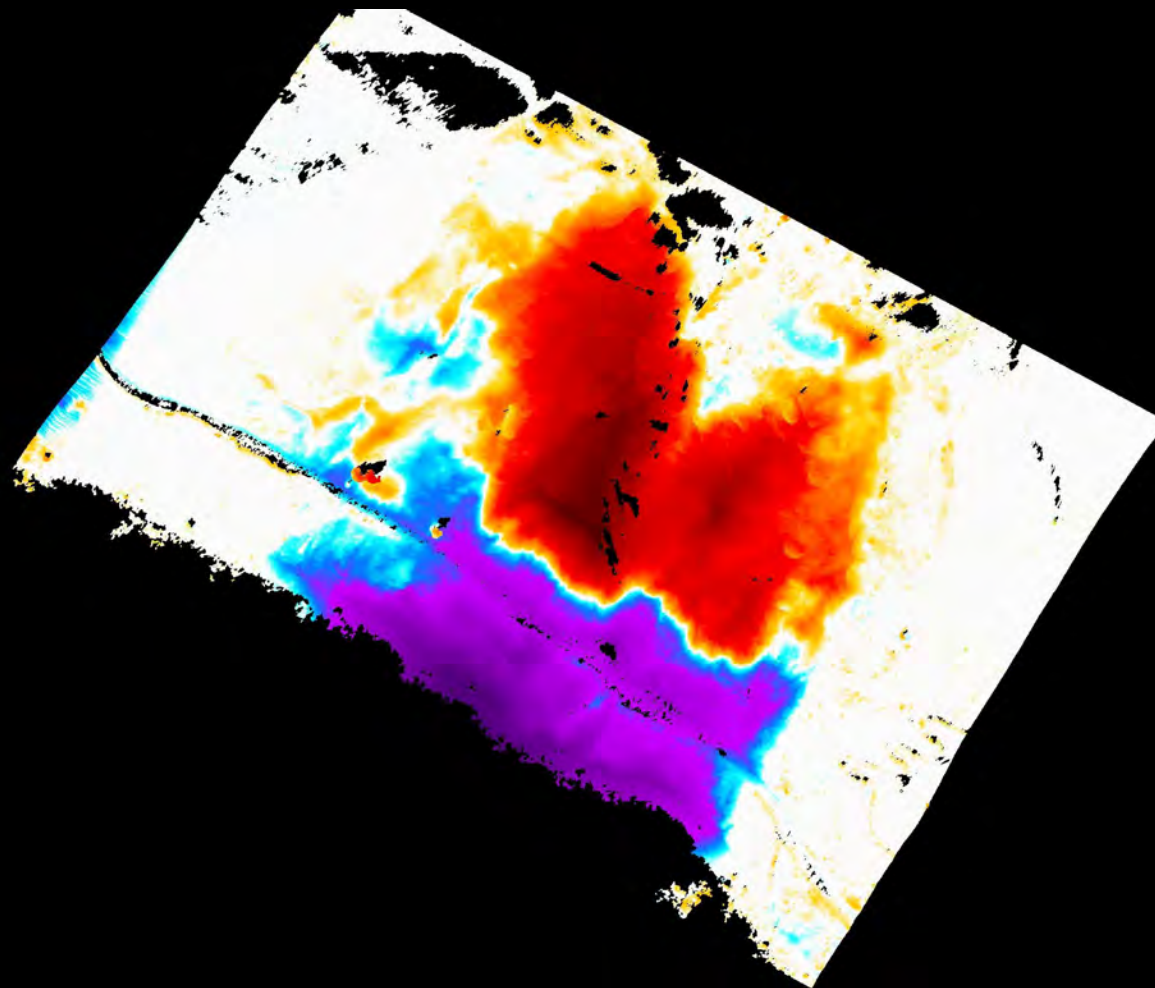
400

Photo Source:
U.S. Geological Survey

May 27, 2017

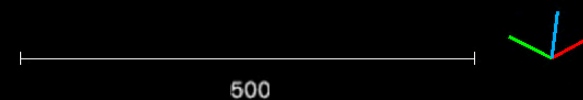
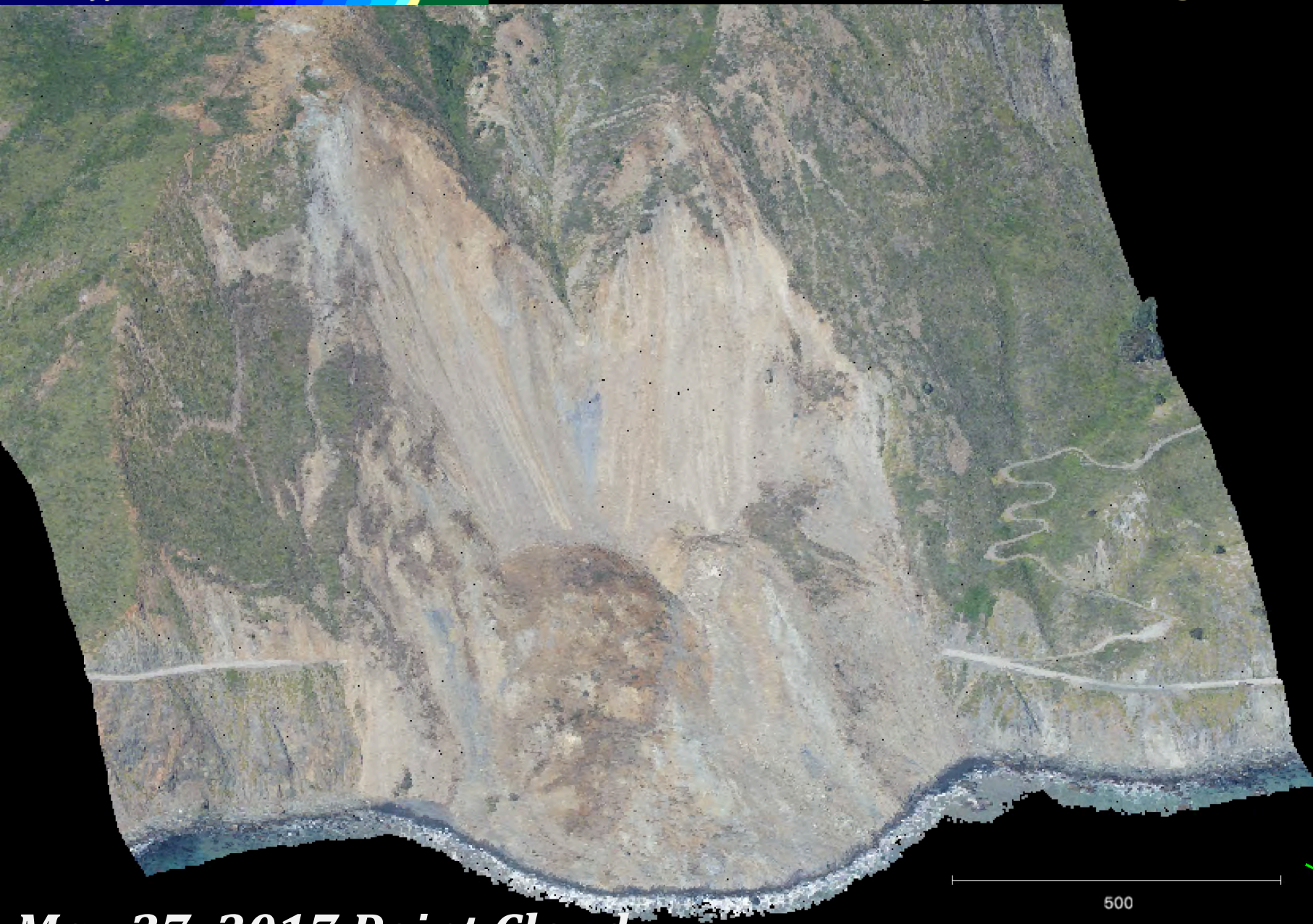
PROVISIONAL DATA SUBJECT TO REVISION

Mud Creek – Topographic Point Cloud – Vertical Perspective



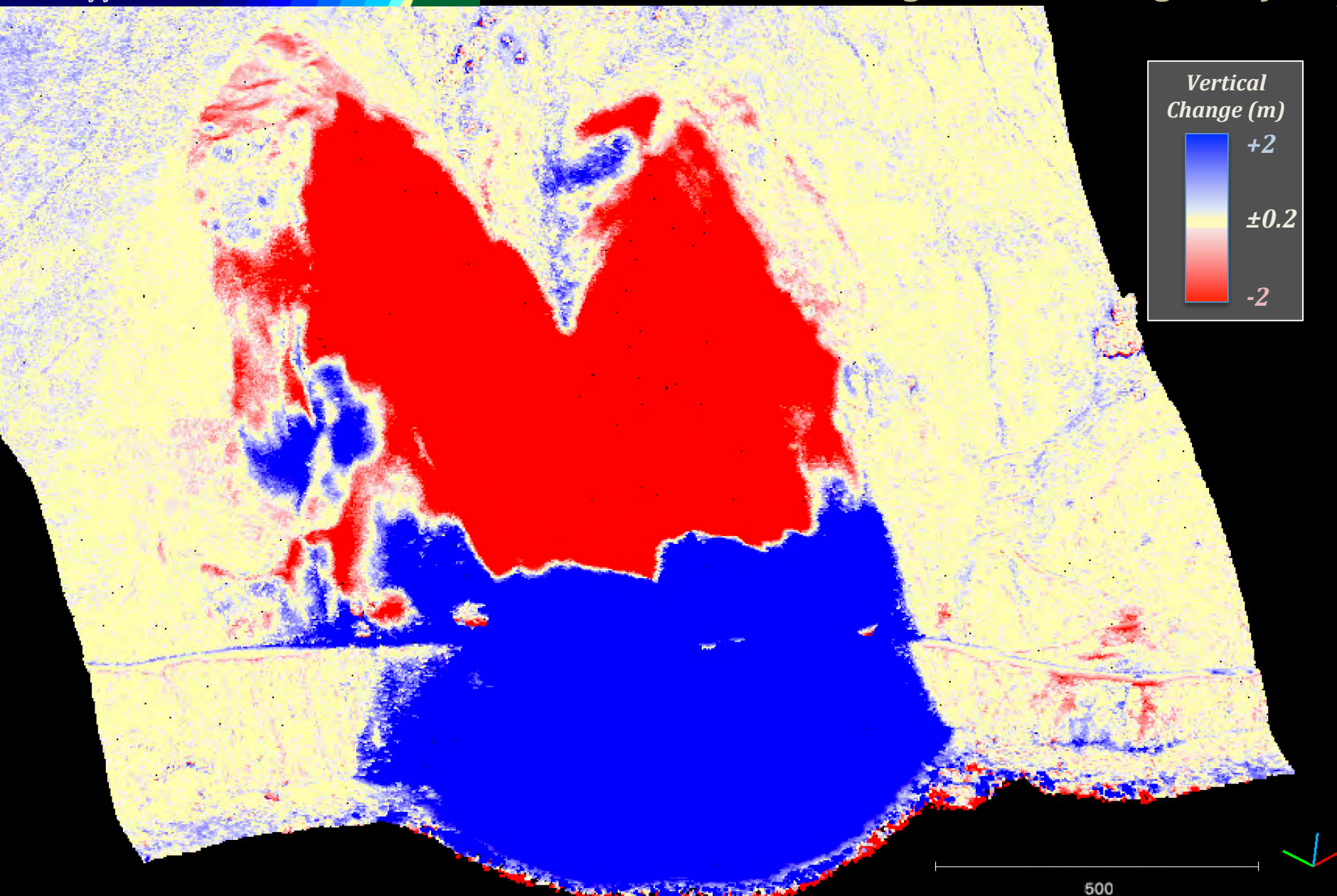
2015-'17 Topographic Change

PROVISIONAL DATA SUBJECT TO REVISION



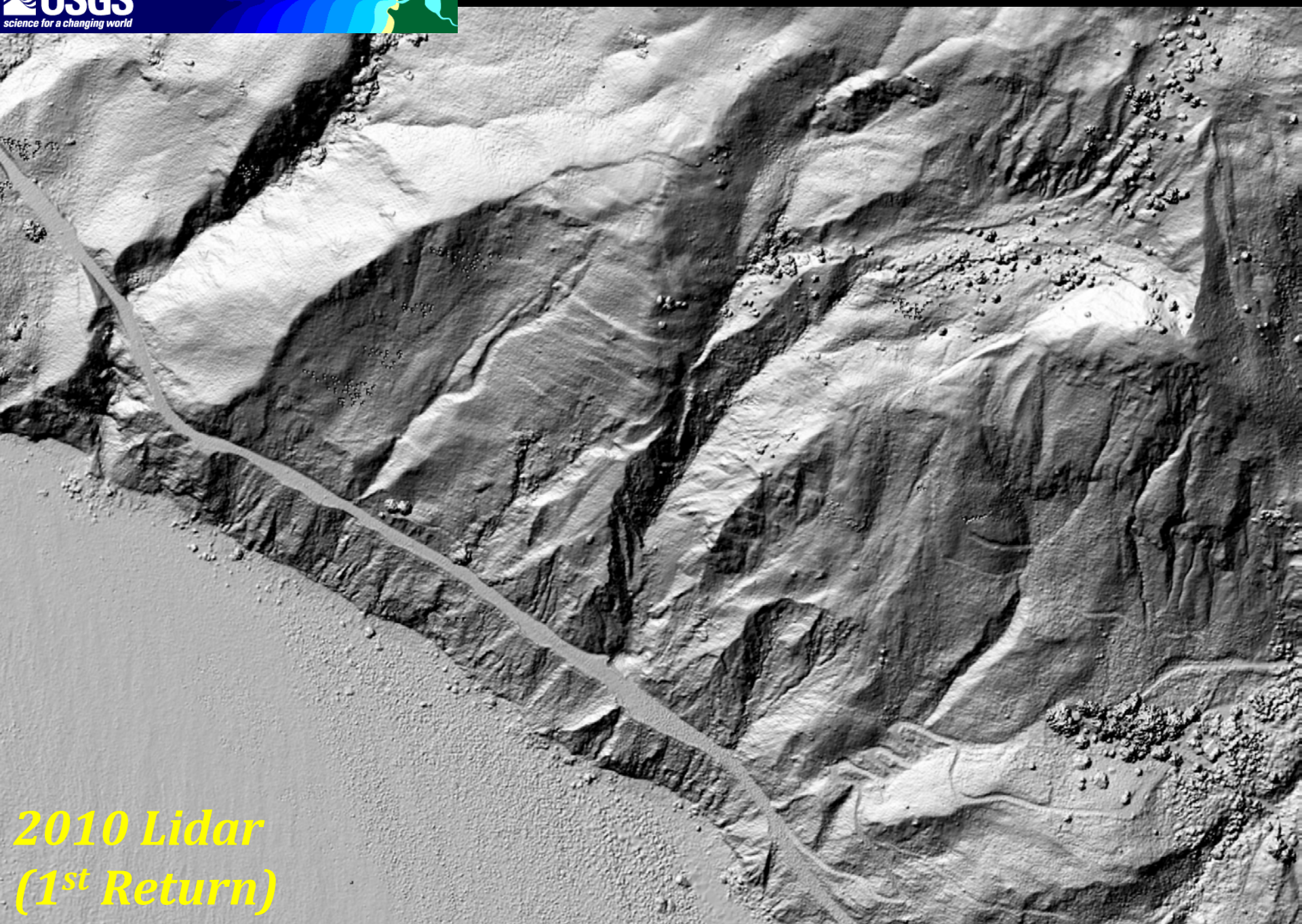
May 27, 2017 Point Cloud

PROVISIONAL DATA SUBJECT TO REVISION



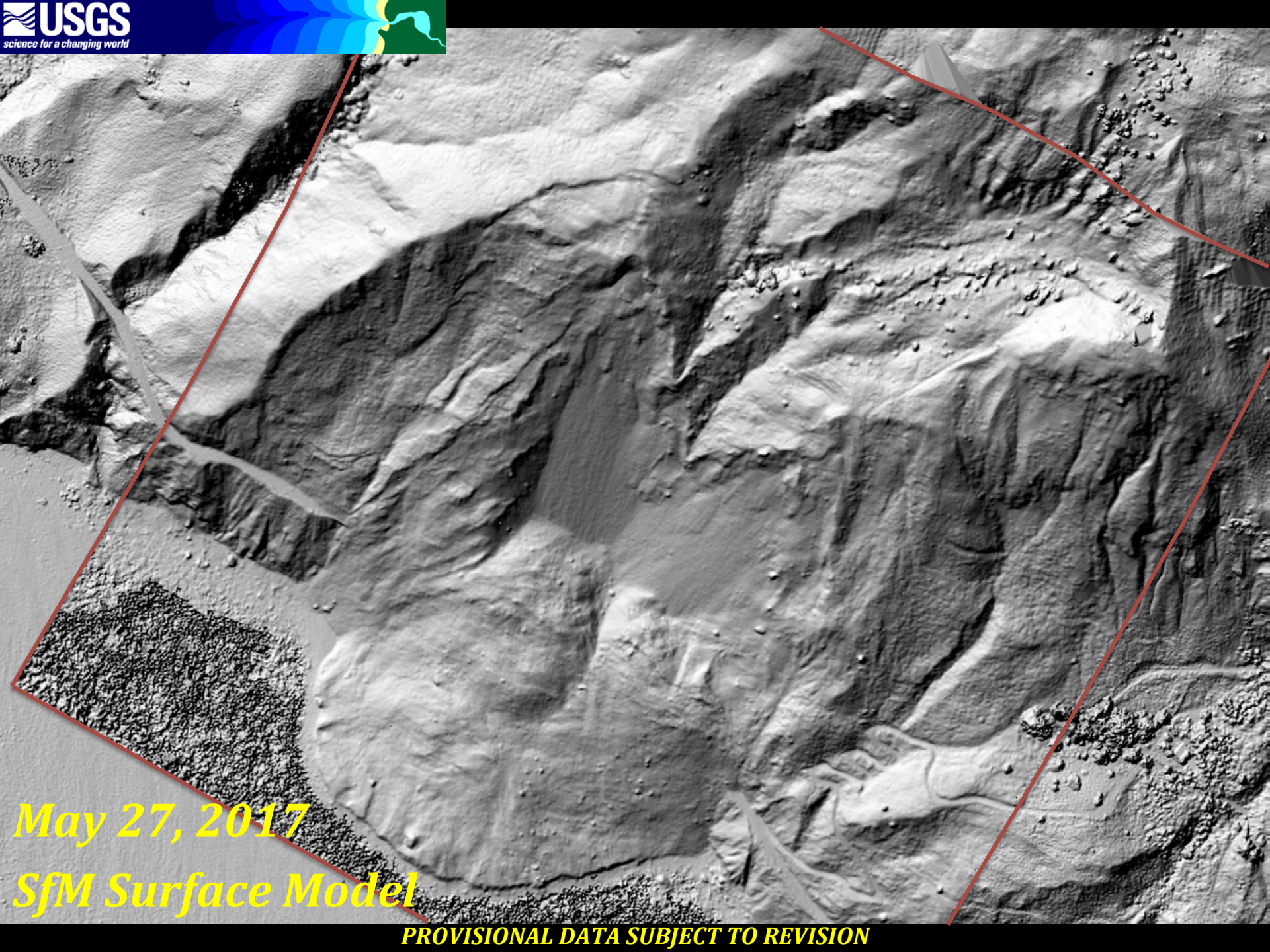
2016 Lidar vs. 2017 SfM Point Cloud

PROVISIONAL DATA SUBJECT TO REVISION



**2010 Lidar
(1st Return)**

PROVISIONAL DATA SUBJECT TO REVISION



May 27, 2017
SfM Surface Model

PROVISIONAL DATA SUBJECT TO REVISION

For More Information:

*Jonathan A. Warrick
jwarrick@usgs.gov*